What is claimed is:

1. A purified core 1 β3-galactosyl transferase specific molecular chaperone which is substantially free of other proteins.

2. The purified core 1 β3-galactosyl transferase specific molecular chaperone of claim 1 wherein the core 1 β3-galactosyl transferase specific molecular chaperone is a vertebrate core 1 β3-galactosyl transferase specific molecular chaperone.

3. The purified core 1 β3-galactosyl transferase specific molecular chaperone of claim 2 wherein the core 1 β3-galactosyl transferase specific molecular chaperone is a mammalian core 1 β3-galactosyl transferase specific molecular chaperone.

4. A purified core 1 β3-galactosyl transferase specific molecular chaperone, comprising at least one of an amino acid sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, and SEQ ID NO: 7; and an amino acid sequence which has at least about 90% identity with SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, or SEQ ID NO: 7, and which has activity of a core 1 β3-galactosyl transferase specific molecular chaperone.

5. A recombinant core 1 β3-galactosyl transferase specific molecular chaperone.

6. A polynucleotide which encodes a protein having core 1 β3-galactosyl transferase specific molecular chaperone activity, comprising:

(A) a coding portion of at least one of SEQ ID NO:2, SEQ ID NO: 4, SEQ ID NO: 6, or SEQ ID NO: 8;

(B) a polynucleotide which hybridizes with a coding portion of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, or SEQ ID NO: 8 under stringency conditions comprising prehybridization and hybridization at 68°C followed by washing twice with two x SSC, 0.1% SDS at 22°C, and washing twice with 0.2 x SSC, 0.1% SDS at 22°C; or prehybridization and hybridization at 42°C in 5 x SSPE, 0.3% SDS, 200 ug/ml sheared and denatured salmon sperm DNA, and 25% formamide, or 35% formamide, or 50% formamide, and washing with 2 x SSC, 0.2% SDS at 50°C. And which has core 1 β3-galactosyl transferase specific molecular chaperone activity;

(C) a polynucleotide which differs in nucleotide sequence from the isolated polynucleotides of (A) above due to degeneracy of the

genetic code and which encodes a protein having core 1 β3-galactosyl transferase specific molecular chaperone activity; or

(D) a polynucleotide which differs in nucleotide sequence from the polynucleotides of (A), (B) or (C) in that said polynucleotide lacks a nucleotide sequence which encodes a transmembrane domain wherein the core 1 β3-galactosyl transferase specific molecular chaperone encoded is soluble.

7. The polynucleotide of claim 6 wherein the polynucleotide is DNA.

8. A vector containing the polynucleotide of claim 6.

9. A host cell transformed or transfected with the vector of claim 8.

10. The host cell of claim 9 wherein the polynucleotide is operatively associated with an expression control sequence.

11. The host cell of claim 9 transformed or transfected with an expressible polynucleotide encoding a peptide or polypeptide requiring post-translational glycosylation to form a core 1 structure.

12. The host cell of claim 11 wherein the peptide or polypeptide requiring post-translational glycosylation to form a core 1 structure comprises P-selectin glycoprotein ligand-1 or a portion thereof which has P-selectin binding activity.

13. A process for producing a purified core 1 β3-galactosyl transferase specific molecular chaperone comprising the steps of:

culturing the host cell of claim 9 thereby expressing the core 1 β3-galactosyl transferase specific molecular chaperone; and

purifying the core 1 β3-galactosyl transferase specific molecular chaperone from the cultured host cell.

14. The process of claim 13 wherein the core 1 β3-galactosyl transferase specific molecular chaperone is soluble.

15. A process for producing a purified protein or peptide requiring post translational glycosylation having a core 1 structure, comprising the steps of:

culturing a host cell having an expressible polynucleotide encoding a peptide or polypeptide requiring post-translational glycosylation to form a core 1 structure, the host cell transformed or transfected

with an expressible polynucleotide encoding core 1 β3 galactosyl transferase, and with the vector of claim 8;

expressing in the cultured host cell the core 1 β3 galactosyl transferase, the core 1 β3-galactosyl transferase specific molecular chaperone, activity, and the protein or peptide requiring post translational glycosylation, thereby forming a glycosylated protein or peptide having a core 1 structure; and

purifying the protein or peptide having the core 1 structure.

16. An in vitro method of galactosylating a protein or peptide requiring part-translational glycosylation to form a core 1 structure, the method comprising the steps of:

providing a protein or peptide requiring post-translational glycosylation to form a core 1 structure;

providing a protein having core 1 β3-galactosyl transferase specific molecular chaperone-1 activity and a core 1 β3-galactosyl transferase, wherein the protein having core 1 β3-galactosyl transferase specific molecular chaperone-1 activity is encoded by the polynucleotide of claim 6;

providing a galactose donor; and

combining the protein or peptide requiring post-translational glycosylation with the protein having core 1 β3-galactosyl transferase specific molecular chaperone-1 activity and the core 1 β3-galactosyl transferase and with the galactose donor under conditions suitable for causing galactosylation of the protein or peptide required glycosylation thereby forming a protein or peptide with a core 1 structure.

17. An expression system comprising:

a host cell comprising:

an expressible polynucleotide which encodes a core 1 β3-galactosyl transferase; and

an expressible polynucleotide which encodes a core 1 β3-galactosyl transferase specific molecular chaperone for expressing an active core 1 β3-galactosyl transferase.

18. The expression system of claim 17 wherein the expressible polynucleotide which encodes a core 1 β3-galactosyl transferase specific molecular chaperone comprises a coding sequence of SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, or SEQ ID NO: 8.

19. An assay for detecting a condition characterized by defective presence of core 1 β3-galactosyl transferase, comprising:

detecting in a biological sample a mutant of core 1 β3-galactosyl transferase specific molecular chaperone.

20. The method of claim 19 wherein the mutant lacks a portion of the C-terminal domain of SEQ ID NO: 1.

21. A host cell comprising a polynucleotide encoding a core 1 β3 galactosyl transferase specific molecular chaperone.